CHETCO BAR FIRE SALVAGE
DRAFT SILVICULTURAL PRESCRIPTION
June 22, 2018

Environmental Setting

The Chetco Bar Fire salvage project area is in the Chetco River and Pistol River 5th field watersheds subdivided into 6th field watersheds listed in Table 1 (EA). Treatment units are within 10-16 air miles of the Pacific Ocean at elevations ranging 200 to 3,500 feet. Aspects range westerly to southerly to easterly with some northerly aspects (Appendix B map).

There are 4,090 acres of salvage treatment units within managed and unmanaged stands that have greater than 50% tree basal area mortality caused by the wildfire. Approximately 1,868 acres (46%) are managed stands. Logging systems include 619 acres ground based (15%), 2,378 acres skyline (58%) and 1,093 acres helicopter (27%) listed in Table 4 (EA). All units are within the Matrix land allocation on Forest Service land.

Table 1. Project Area 6th Field Subwatersheds

Watershed Name	Acres
Eagle Creek-Chetco River	30,830
East Fork Pistol River-Pistol River	18,695
Nook Creek-Chetco River	29,150
North Fork Pistol River-Pistol River	19,241
South Fork Chetco River	28,821
South Fork Pistol River	16,310
Total Acres in Project Area	143,047

Table 1. Proposed Action Logging Systems

Logging Systems	Acres
Helicopter	1,093
Skyline	2,378
Tractor	619
Total	**4,090**

Current Condition

The current condition of vegetation within the Chetco Bar fire perimeter are wide expanses of dead trees and sprouting vegetation associated with high basal area mortality areas interspersed with underburned and unburned stands associated with low to moderate basal area mortality areas.

Overstory tree species is dominantly composed of Douglas-fir (*Pseudotsuga menziesii)* interspersed with thickets of tanoak (*Notholithocarpus densiflorus).* Other conifer tree species include Port-Orford-cedar (*Chamaecyparis lawsoniana),* knobcone pine (*Pinus attenuate),* sugar pine (*Pinus lambertiana),* western white pine (*Pinus monticola)* and western hemlock (*Tsuga*

heterophylla). Hardwood species include chinquapin (*Chrysolepis chrysophylla),* Oregon myrtle (*Umbellularia californica),* big leaf maple (*Acer macrophyllum)* and red alder (*Alnus rubra).*

Many forest stands of varying age classes were reset to the stand initiation stage (Oliver 1996) by stand replacement fire. Areas within high tree mortality burn are often far from conifer seed sources and within areas where substantial competition from sprouting vegetation is expected. Tree shading in riparian reserves has been mostly consumed in high basal area mortality areas.

Redwoods

The southern portion of the Chetco Bar fire is located within the northernmost boundary of the coast redwood range (*Sequoia sempervirens)*. Proposed treatment units are located outside of areas with natural redwood canopy cover, though old district maps (Appendix F) show some managed stands planted with redwood east of Basin Creek and south of Panther Creek. Redwoods within burned areas have profuse vegetative sprouting along and around tree boles. All redwoods shall be retained. Any redwood that needs to be cut for safety reasons shall be left on site and not removed.

Potential Vegetation Type (PVT)

PVTs were developed to represent vegetation types that generally exhibit consistent dynamics forest growth, disturbance types and rates through time (Henderson 2013). PVTs are not a representation of current vegetation, but rather reflect *site potential* and are more generalized than plant association groups. PVT mapping is based on vegetation-environment relationships and relate primarily to soil types, climate gradients and topography.

PVT mapping in the Matrix land allocation portion of the Chetco Bar fire (aka: planning area) is primarily the *Tanoak/ Douglas-fir-moist* PVT (Appendix B map). *Tanoak/Douglas-fir-moist* is a compilation of two tanoak plant associations with Douglas-fir as co-climax species and three tanoak plant associations with western hemlock as a co-climax species. These plant associations are on the warm/moist portion of the temperature/ moisture regime in the environmental graph for the tanoak series in *Field Guide to the Forested Plant Associations of Southwestern Oregon* (Atzet et. al, 1996). Coastal tanoak plant associations occur an average 1,000 feet elevation with no aspects favored.

Subordinate amounts of *Tanoak/Douglas-fir-dry* PVT mapping occur in the northwest portions of the project area with scattered *Douglas-fir dry* PVT occurring on drier landform positions mostly along ridgelines.

Post-fire tanoak regeneration will sprout rapidly in the *Tanoak/Douglas-fir moist PVT*. Tanoak is a heavy seeder that reproduces well from seed and prolifically from vigorous sprouting when above ground plant parts are consumed by fire. Tanoak often form pure even-aged stands and grows best on humid, moist slopes of coastal regions (Burns, Honkala 1990). Tanoak is climax in the moist middle of southwestern Oregon's environmental gradient where frost and drought occur less often (Atzet et. al, 1996).

The growing space for conifers that seed in naturally or are artificially planted post-fire will receive significant competition for site resources from tanoak and sprouting vegetation. Tanoak sprouts grow rapidly in good light and can average two feet per year the first 15-20 years often

dominating vegetation cover following fire (Roy 1957). Conifer trees that become established will grow slowly until tree height overtops surrounding vegetation or succumbs to competition.

Local research on the Siskiyou National Forest of three naturally regenerated stands following a large fire in 1881 noted most of the Douglas-fir regeneration established between 1890 and 1920 indicating a delayed and prolonged period of conifer establishment following this wildfire (Little et al. 1995). Figure 1 of this paper show these study sites located on Gold Beach Ranger District (Fairview, Panther Lake, Pistol River) and within proximity to the Chetco Bar fire.

Prolonged natural conifer regeneration is supported by regional research (Hibbs, 2009), one of the key findings in this paper noted abundant conifers regenerating 10 to 15 years post-fire. Another regional study of conifer regeneration 9-19 years after fires in southern Oregon and northern California noted conifer regeneration to be surprisingly protracted and variable ' (Shatford et al., 2007).

Soils

Soils are developed from metamorphic and sedimentary rocks from the Dothan Formation. The topography of the Dothan Formation varies from low, rolling ground to steep hillslopes as well as prominent ridges and rock outcrops. Soils are mostly in a mesic soil temperature regime, with highest elevations in the frigid soil temperature regime (Ochoa, 2018).

The areas of low relief are predominantly in mudstone, siltstone, and shale. Soils in mudstone, siltstone, and shale are generally silty and clayey, deep (40 to 60 inches), and poorly drained. Areas of steeper relief are predominantly sandstone or overlaid with sandstone. Soils in sandstone tend to be sandy, well drained, and depths of moderately deep (20 to 40 inches) on slopes to shallow (< 20 inches) on ridges. Dothan volcanics form thin, rocky soils or outcrops.

Soil Map Units (SMU)

The dominant soil map units (USDA, NRCS 2005) are SMUs 122F, 123F, and 238E accounting for approximately 84% of soil mapping in the project area footprint (see Ochoa 2018 for soil mapping and map units). Soil series represented by these map units are Fritsland-Bravo-Cassiday (SMUs 122F, 123F) and Skookumhouse-Hazelcamp-Averlande (SMU 238E) derived from metasediments and weathered sandstone.

Management limitations are susceptibility of surface layer to water erosion, displacement, compaction when wet, and available water capacity for the shallower soils with gravelly to extremely gravelly surface and subsurface layers (Averlande and Cassidy soil series).

Forest Productivity

Soil map units are rated by using the productivity ranges in Web Soil Survey. Site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. Within the project footprint the dominant tree measured for site index is Douglas Fir, and the site index base was developed following James E. King (1966 (795)). Site index applies to fully stocked, even-aged, unmanaged stands.

Soil Rating Polygons

<= 82
> 82 and <= 91
> 91 and <= 108
> 108 and <= 119
> 119 and <= 126
Not rated or not available

Site Index ranges used to rate forest productivity in Web Soil Survey

The site index for proposed units within the project footprint range 82 to 126. The dominant site index for SMUs 122F, 123F, and 238E is high. All soils, with the exception of a few small, shallow, rocky inclusions, support forest vegetation (Ochoa, 2018).

Past Management

Managed stands in Alternative 3 consist of 81 units with past management activities occurring from 1953 to 2013 (Appendix D):

- **seventy (70)** units (86%) clearcut and planted, forty-five (45) of these units (64%) clearcut in 1970 or sooner (i.e. up to 47 years old at the time of the fire).
- **seven (7)** units labeled 'BP' in the sale name; BP = Brush Patch, which probably means the sales were stand conversion treatments[1].
- **two (2)** units are evaluation plantations established in 1976 - Broken Basin EP #13 and Long Ridge BP U-3 EP #18.
- **eight (8)** units (10%) commercially thinned within the last seven years (UC thin, Backbone thin) under *Coastal Healthy Forest Treatments* (USDA Forest Service 2007).

Diseases of Concern

Port-Orford-cedar root disease

Port-Orford-cedar root disease, caused by the non-native pathogen *Phytophthora lateralis* (PL), causes high levels of mortality of POC on high risk sites. Trees of all sizes may be affected. High-risk sites are low-lying wet areas (regardless of disease status) that are located downslope from infested areas or are below likely sites for introductions, especially roads. They include streams, drainage ditches, gullies, swamps, seeps, ponds, lakes, and concave low-lying areas where water collects during rainy weather.

Recent POC mapping on the Siskiyou National Forest (Nielsen 2013) indicates POC present at the higher elevations in the northern half of the project area. Proposed salvage units do not have PL-infested areas within or adjacent to unit boundaries. There is one PL-infested stream in proximity, East Fork Pistol River, outside of the project area (Appendix A map).

[1] Pers. Com. - Robyn Darbyshire, Regional Silviculturist, March 26, 2018. Robyn had worked as a silviculturist on the Chetco RD during her early career.

There are uninfested 7th field watersheds, as defined in the 2004 LRMP amendment, within the project area. Units 92, 93, 133, 134, 135, 136, 137, 138, 139, 140, 141, 143 are within or adjacent to these uninfested watersheds.

Salvage logging and other connected actions (e. g. using untreated infested water to wash vehicles or dust abatement) may potentially spread PL. A POC Risk Key has been assembled in compliance with the *Record of Decision for the Land and Resource Management Plan Amendment for Management of Port-Orford-cedar in Southwest Oregon, Siskiyou National Forest* (USDA Forest Service 2004). The risk key is attached in Appendix A, and is used to clarify the environmental conditions that require implementation of one or more of the disease controlling management practices listed in the LRMP amendment.

Tree planting genetically resistant POC seedlings is recommended to increase landscape resistance to PL infection within un-infested 7th-field watersheds and adjacent areas.

Sudden Oak Death

Sudden oak death (SOD), caused by the non-native pathogen *Phytophthora ramorum* causes mortality, shoot dieback, or leaf blight in over 130 species of trees, shrubs, herbs, and ferns. Statewide SOD occurs *only* in the forests of southwest Curry County (and within the Chetco Bar fire area), where it is well adapted to mild, wet coastal conditions.

Currently, post-fire vegetation is predominantly tanoak (*Nontholithocarpus densiflorus*) naturally regenerating through sprouting and seed across the burned area. Tanoak is the primary host in Oregon for SOD. The pathogen readily kills tanoak trees of all sizes.

SOD can alter the ecology of southwest Oregon forests and threatens timber trade, the floral green industry, Christmas tree production, and nursery trade throughout Oregon. *P. ramorum* is an internationally quarantined plant pathogen and there are Federal and State regulations in place that restrict movement of host material to prevent human-assisted spread.

Five hundred-fifteen (515) square miles in Curry County are currently under quarantine. The Chetco Bar fire occurs both within (western portion of fire) and outside the current SOD quarantine area. Most of proposed salvage units are within the 2015 quarantine area boundary except units 138, 139, 140, 141, 142 and the northern tip of unit 143 (refer to the silvicultural prescription, appendix A map). The silvicultural prescription includes mitigation measures to reduce the risk of spreading the pathogen. Host plants cannot be moved outside the quarantine area unless mitigation measures such as heat treatment or debarking have been done. Soil cannot be moved from infested sites.

Over 6,200 acres have been treated to slow the spread of the pathogen since the disease was first detected in 2001. Treatments include cutting, piling, and burning affected and exposed hosts. Approximately 75 percent of the treatments have occurred on private and state lands while 25 percent have occurred on Forest Service and BLM lands as of summer 2017 (Goheen, 2017).

Aggressive management strategies are currently in place to slow the spread of SOD; however, area pathologists anticipate the disease will continue to cause tanoak mortality in moist tanoak forests now and into the future. Artificial regeneration (planting) of non-bole hosts may help to slow the spread of SOD. Breaking up large continuous areas of tanoak in structure and species composition will change disease spread dynamics by slowing initial local disease spread,

reducing inoculum levels overall, and reducing the probability of long-distance spread, while still maintaining tanoak on the landscape. As tanoak is a prolific sprouter and a fast-growing species, tree planting may be necessary for species other than tanoak to become established and dominate the canopy in the short term. (silvicultural prescription, appendix A, FHP input).

White Pine Blister Rust

White pine blister rust, caused by the non-native pathogen *Cronartium ribicola*, was identified in the Pistol River watershed analysis (USDA 1998) causing mortality and dieback of higher elevation sugar pine and western white pine in the vicinity of Snow Camp Mountain. A recent publication *Status of Sugar and Western White Pines on Federal Forest Lands in Southwest Oregon* (Goheen, Goheen, 2014) noted tree mortality exhibited by sugar pine and western white pine as high and a matter for concern. Tree mortality of five-needle pines was greater than mortality of all other tree species encountered in surveyed stands. Inventory data displayed in Figure 15 of this paper shows a number of plots within the fire perimeter had sugar pine or western white pine present.

One recommendation in this publication, to manage for continued presence of five-needle pines to ensure their health on the landscape, is to initiate successful sugar pine and western white pine regeneration by tree planting site-adapted, white pine blister rust resistant stock.

Artificial Regeneration - Future High Severity Fires

Current Forest direction for the Chetco Bar fire is to delay artificial regeneration and survey for natural regeneration post-salvage to determine if stocking levels are sufficient to meet the NFMA five-year regeneration requirement to stocking levels consistent with management objectives for Matrix[2]. The Forest is planning to develop a post-fire reforestation strategy that will address tree planting needs and planting density in the context of susceptibility to future high severity fires, climate change and land management objectives.

The effects of young-stand plantations on fire behavior has been studied and debated. While it is a commonly held and widely cited view that young conifer plantations experience higher severity fire than naturally regenerated stands, there is not consensus within the scientific community. Fire susceptibility in plantations vary depending on post-harvest methods of fuels treatment and site preparation, the species mix of understory vegetation, plantation size, and fuels management in the surrounding forest.

One local study in the 2002 Biscuit fire area examined 198 plantations, five (5) to forty-seven (47) years old, concluded the best predictor of plantation canopy damage is age and the level of canopy damage reached its maximum around age 15 and stayed relatively high until age 25 before declining (Thompson et al.. 2011).

Management Direction

The Chetco Bar fire salvage project is within the Matrix land allocations Management Area 13 and Management Area 14, in the Land and Resource Management Plan for the Siskiyou National Forest (LRMP) (USDA, 1989), as amended by the Northwest Forest Plan (NWFP) (USDA-

[2] Pers. Com. – Ken Wearstler, Forest Silviculturist, Rogue River-Siskiou NF, November 2017.

USDI, 1994). Treatments must also comply with the LRMP amendment for POC management (USDA Forest Service 2004).

Management Area -13 – Partial Retention Visual

The objective of this management area is to protect scenic values while providing multiple-use development opportunities that are visually subordinate to the characteristic landscape. This management area primarily consists of National Forest System land visible from major and secondary travel routes, rivers and other high use recreation areas (often in the middle to background). This area has multiple use goals which include the production of wood products. Visual Quality Objective (VQO) is the same as MA-12, Retention (LRMP, IV-131) except evidence of management activities will be more apparent to the average visitor (LRMP, IV-136). There are about 1,140 acres (28%) of MA 13 Partial Retention Visual in the project footprint.

Management Area 14 – General Forest

The objective of this management area is primarily to provide sustainable timber harvest opportunities subject to multiple resource standards and guidelines in the LRMP as amended by the NWFP. The majority of high and medium site stands in MA-14 should have sufficient stocking to follow the intensive management option (LRMP, IV-141). Forest-wide standards and guidelines define minimum stocking as 125-150 crop trees per acre (LRMP, IV-42). VQOs are Modification and Maximum Modification (LRMP, IV-140). There are about 2,920 acres (72%) of MA 14 General Forest in the project footprint

National Forest Management Act

On November 19, 2002, the Regional Forester provided the following direction for salvage:

Salvage on deforested suitable lands (and other capable and available lands where salvage is permitted by a forest plan) that is driven all or in part by an objective to capture volume should comply with the NFMA five-year regeneration requirement (to stocking levels consistent with management objectives). This is specific direction adhering to the NFMA regulations at 36CFR219.27(c)(3), including its amendments to the Forest and Rangeland Renewable Resources Planning Act of 1974 (P.L. 93-378) requiring "when trees are cut to achieve timber production objectives, the cuttings shall be made in such a way as to assure that the technology and knowledge exists to adequately restock the lands within 5 years after final harvest.".

The NFMA at Sec. 3 (d)(1) It is the policy of the Congress that all forested lands in the National Forest System be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and conditions of stand designed to secure the maximum benefits of multiple use sustained yield management in accordance with land management plans."

The Regional Forester's Letter also states where no salvage is done, deforested capable lands should be reforested as quickly as practicable. Plans to reforest non-capable lands should be made after careful consideration of land management objectives and the likelihood of success.

Large Woody Debris and Snags

Siskiyou Supplement

The *Siskiyou Supplement – Guidelines for Harvest Prescriptions* (1996, 1997, 2001) provides guidelines for large woody material (LWM), green tree retention and wildlife reserve tree (i.e. snag) retention primarily for final harvest[3] in the Matrix land allocation.

These guidelines responded to NWFP direction to develop models for computing numbers and sizes of logs for groups of plant associations and stand types to address coarse woody debris management in Matrix (NWFP, C-40). LWM/snag levels within the Siskiyou Supplement are based on local ecoplot data provided by Tom Atzet, southwest Oregon area ecologist (retired).

A Forest interdisciplinary team developed the Siskiyou Supplement (page 12). Prescriptions using these guidelines meet the intent of the LRMP as amended by the NWFP (page 21).

Decision Key

The decision key in the Siskiyou Supplement is designed to be followed by an interdisciplinary team when planning projects which may impact levels of LWM. When this decision key indicates that the Siskiyou Supplement does not *"fit"* a given situation (e.g. endangered species needs, unstable soils, updated science, DecAid, etc.) a new prescription may be developed.

Chetco Bar Fire Project Area

The goal of large woody material (LWM) and snag retention during fire salvage treatments is to leave *variable* quantities across the landscape based on site productivity, landform position, resource objectives, proximity to untreated burned areas and logging system logistics. Total amounts of LWM retained should be close to the mean for the dominant plant series.

Potential Vegetation Type mapping for the project area is almost entirely within the LIDE (tanoak) plant series (Appendix B map). The amounts of LWM for this plant series in Table 1a of the Siskiyou Supplement, has a range of 0-39 pieces* with a mean 10 pieces per acre (Appendix B). The minor amounts of *Douglas-fir dry* PVT (Douglas-fir series) has a range of 0-15 pieces with a mean 5 pieces per acre. Snag retention for all series is 2 to 2.5 snags** per acre, clumped in aggregates where possible with scattered single trees.

* minimum 20 inch diameter large end by 20 foot long.
**minimum 15 inch diameter and 10 feet tall.

The following definition of high-medium-low LWM ranges*** and landscape stratification are designed to provide variability in pieces per acre across the landscape for the combined tanoak/Douglas-fir series (can choose from low end of range where standing dead trees are abundant):

- High = 20-27+ pieces/acre
- Medium = 11-19 pieces/acre
- Low = 3-10 pieces per acre

*** Based on IDT definitions from Tin Can project on the Siskiyou NF with similar tanoak/DF plant associations.

[3] pers. com. Robyn Darbyshire, Regional Silviculturist, March 7, 2018, timber salvage treatments are considered to be regeneration (final) harvests.

Landscape Stratification

Ridgelines - subject to more frequent fires with lower amounts of down wood accumulated (except windthrow events), less likely to be used for NSO nesting and are opportune areas for fire-fighting tactics.

Low end of LWM range, 3-10 pieces per acre.

North and East aspects - moister microclimates, tend to be productive sites with lower fire frequency and higher accumulations of down wood.

Moderate end of LWM range, 11-19 pieces per acre.

South and West Aspects – hotter and drier microclimates, historically more frequent fires that limit down wood accumulations, generally shallower soils with lower productivity to produce large wood.

Low end of LWM range, 3-10 pieces per acre.

Private Land Boundaries - reduce fire risk within one site potential tree (175 feet) of land ownership boundaries by having lower quantities of snags and limiting down wood accumulation <= 18 inch depth and post-harvest fuel loading of 10-30 tons per acre as recommended for cooler, moister forest types (Brown et al., 2003).

Low end of LWM range, 3-10 pieces per acre.

Riparian Reserves – outside of the project area though within or connected to proposed salvage units. Benefits of LWM in riparian reserves are terrestrial connectivity, fish habitat, links between aquatic and terrestrial habitats, and stream channel stabilization.

High end of LWM range, 20-27+ pieces per acre depending on type of riparian area (i.e. conifer dominated, hardwood dominated, meadow or ultra-mafic (Chetco River watershed analysis, 1996).

DecAid – best available science

- See Appendix C – **new prescription A.**

Northern Spotted Owl – Post Fire Foraging

- See Appendix C – **new prescription B.**

Silvicultural Objectives

- Provide sufficient standing snags and down wood to meet wildlife habitat needs, long term site productivity while providing for human safety during salvage operations.

- Protect scenic values by allowing management activities to occur but remain visually subordinate to the characteristic landscape for salvage units located in Management Area 13, Partial Retention.

    - **FS 1376** -units 139, 140, 141, 142, 143;
    - **FS 1917** -units 25, 26, 28, 102, 104, 106, 107, 108, 109, 110, 111;
    - **FS 1407-150** - units176, 177 (east portion);
    - **Chetco River** - 76;
    - **FS 1107-573, 1107-571** – units 31 (south half), 32, 33, 34, 35, 36, 38 (west portion), 40, 41, 42, 64, 65, 66, 67 (northern tip);
    - **FS 1909** – units 114, 116, 117, 118, 119, 121, 122, 123, 127, 128, 129.

    Total: **(43 units)** ***confirm units in the visual PDCs..***

- Post-harvest fuel bed depth averages 1 foot within the treatment units, not to exceed a height of 18 inches anticipated to meet optimum fuel loading of 10-30 tons per acre as recommended for cooler, moister forest types (Brown et al., 2003) to reduce fire hazard and resistance to control during future large fires (USDA Forest Service, 2004).

Silvicultural Prescription

See Marking Guide – Appendix E

Future Stand Treatments

Reforestation
Following salvage harvest, treated acres will be surveyed for natural conifer regeneration. The *intent* is to rely on natural regeneration within units. If natural regeneration is determined inadequate to comply with the NFMA five-year restocking requirement, reforestation with site-specific tree species mix shall be manually planted. Tree seedlings shall be planted at appropriate densities to restock treated areas with 125-150 trees per acre to comply with NFMA five-year timeframe. Any natural conifer regeneration shall be considered in stocking and spacing objectives during time of tree planting activities.

Manual site-prep for tree planting can include:

- Removing ground vegetation within a 24-square inch planting site down to mineral soil (i.e. scalp).
- Lop and scatter of existing down wood to open up planting sites using chainsaw as needed.
- Cutting competing shrubs within a 4-foot radius of planting sites using chainsaw as needed.

Restoration Planting
Tree planting genetically resistant POC seedlings within uninfested 7th field watersheds and adjacent low risk areas is highly recommended. Under-planted areas will increase landscape resistance to *Phythophthora lateralis* and enhance:

- stand and landscape forest health
- stand structure
- species diversity

Plant POC seedlings at 18-25 foot spacing or in 10 tree clusters at 100-150 feet apart to lessen the potential of root grafting with infected trees (2004 ROD, pg 36). Plant POC away in areas that maintain moist surface soil year-round but avoid stagnant water. Do not plant POC in infested areas as these areas should be managed for non-host species to reduce the potential for long-term persistence of POC root disease on site.

Plant blister rust-resistant sugar pine and western white pine on warmer south to west facing aspects (Appendix B aspect map). Western white pine may also be planted within proximity to streams in cooler drainges.

Monitoring
Monitor natural conifer regeneration within one to two years of salvage treatments to determine artificial reforestation needs.

Post planting stocking surveys shall be conducted the first and third years following initial tree planting to determine survival and replanting needs.

Planted trees exhibiting wildlife browsing can have vexar tubing or netting installed to protect the seedling's terminal leader from animal damage.

Interdisciplinary team monitoring within one to two years post-harvest to assess efficacy of silvicultural treatments for meeting desired future condition objectives.

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Appendix A

POC Risk Key
POC Inventory map
SOD Project Design Criteria
SOD positive tree ½ mile buffer map
Units within SOD Quarantine map

Southwest Oregon Forest Insect and Disease Service Center
Forest Health Protection
Area Pathologist Input

PORT-ORFORD-CEDAR

CHETCO BAR FIRE SALVAGE PROJECT

Port-Orford-cedar Risk Key

January 24, 2018

The POC Risk Key is used to clarify the environmental conditions that require implementation of one or more of the disease controlling management practices listed in the Record of Decision for the Land and Resource Management Plan Amendment for Management of Port-Orford-cedar in Southwest Oregon, Siskiyou National Forest (USDA Forest Service 2004)**.** The objectives of the amended POC management Standard and Guidelines are to:

- Maintain POC on sites where the risk for infection is low.
- Reduce the spread and severity of root disease in high-risk areas to retain its ecological function to the extent practicable.
- Reestablish POC in plant communities where its numbers or ecosystem function have been significantly reduced.
- Reduce the likelihood of root disease becoming established in disease-free 7th field watersheds.

Program objectives are to maintain POC as an ecologically and economically significant species on National Forest lands. POC management will provide cost-effective mitigation for management activities that create appreciable additional risk to important uninfected POC though not to reduce all risk to all trees at all cost. In areas proposed for timber harvest (salvage) and road building, mitigation would be required as described in this POC Risk Key assessment.

Project-specific NEPA analysis will appropriately document the application of the Risk Key and the consideration of the available management practices. Application of the Risk Key and application of resultant management practices will make the project consistent with the mid- and large-geographic and temporal-scale effects described by the SEIS analysis, and will permit the project analysis to tier to the discussion of those effects.

Application of the Risk Key

1a. Are there uninfected Port-Orford-cedar (POC) within, near, or downstream of the activity area that's ecological, Tribal, or product use or function measurably contributes to meeting land and resource management plan objectives? **Yes.**

Measurably contributing, uninfected POC are present downstream and near proposed salvage treatment units within Mineral Hill Fork and Mislatnah Creek drainages (and their tributaries) inside or outside uninfested 7th field watersheds – units 92, 93, 133, 134, 135, 136, 137, 138, 139, 140, 141, 143.

1b. Are there uninfected Port-Orford-cedar within, near, or downstream of the activity area that, were they to become infected, would likely spread infections to trees whose ecological, Tribal, or product use or function measurably contributes to meeting land and resource management plan objectives? **Yes.**

1c. Is the activity area within an uninfested 7th field watershed as defined in Attachment 1? **Yes.**

Proposed salvage units are located within the following uninfested 7th field watersheds:

04H02F (Mineral Hill Fork) - units 92, 93, 133, 134, 135, 136, 137, 143
04M01F (Mislatnah Creek) – unit 139
04M05W (tributary to Mislatnah Creek) – unit 140

2. Will the proposed project introduce appreciable additional risk of infection to these uninfested Port-Orford-cedars? **Yes.**

Recommended Management Practices (Mitigation Measures)

Project Scheduling- Schedule projects during the dry season or incorporate unit scheduling with vehicle and equipment washing as part of project design.

Utilize Un-infested Water- Use uninfested water sources for equipment washing, road watering and other water-distribution needs or treat water with Clorox bleach to prevent/reduce the spread of PL**.**

Note: *East Fork Pistol River* is an infested stream within proximity to proposed salvage units located in the north end of the project area.

Washing Project Equipment- Wash project equipment prior to entering and beginning work in uninfested 7th field watersheds.

Note: *East Fork Pistol River* is an infested stream within proximity to proposed salvage units located in the north end of the project area.

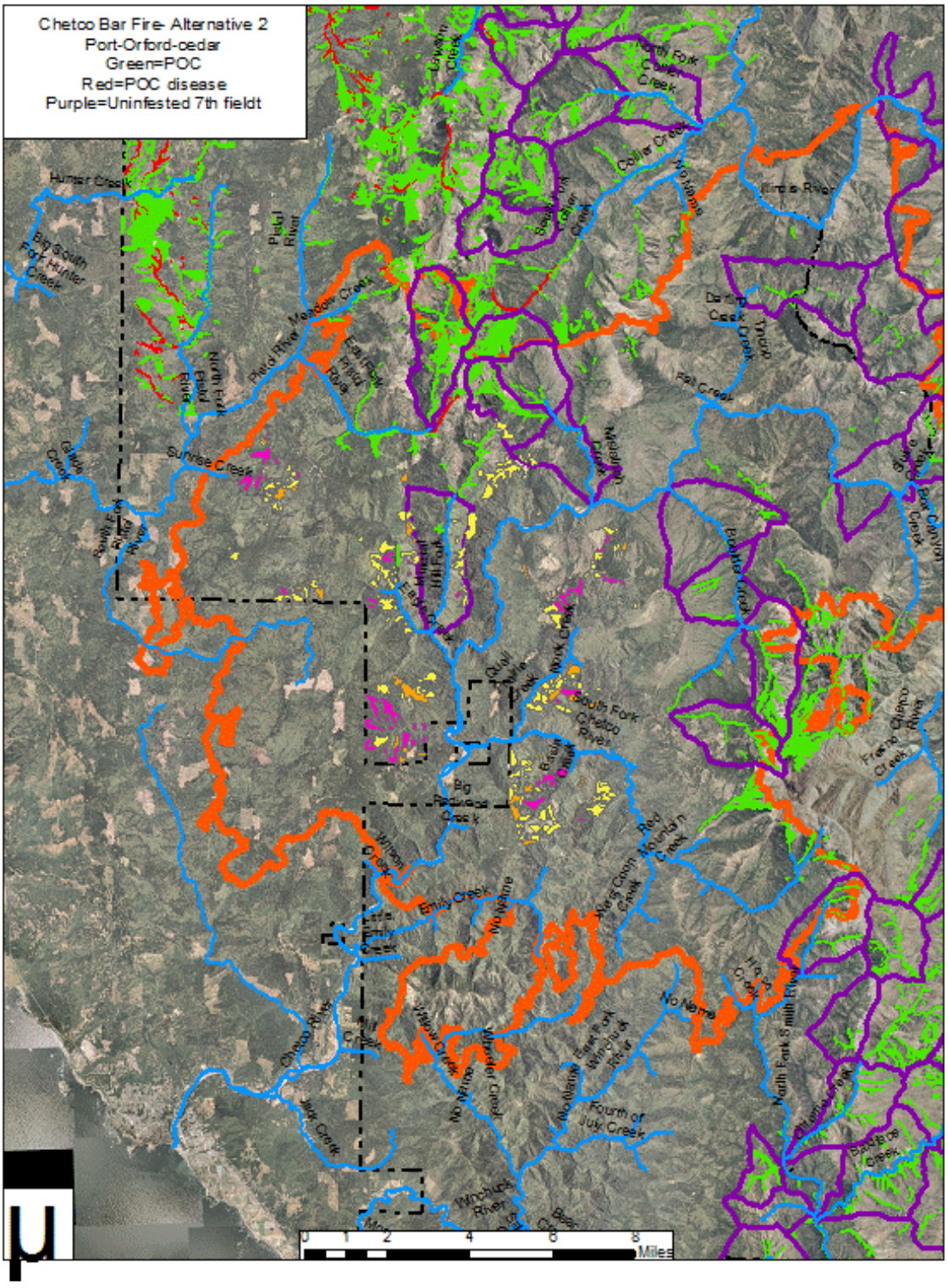
Resistant POC Planting- plant genetically resistant POC seedlings to increase landscape resistance to *Phythophthora lateralis* infection within uninfested 7th field watersheds and adjacent areas.

Climate Change Consideration
In anticipation of potential climate change and species migration, combine seedlots for sowing POC seed for planting as follows:

Original Zone	Lower Elevation Zone	Southern Latitude Zone
225/340 (50%)	210 (25%)	325 (25%) *ask?*

If a lower elevation or southern latitude source is not available, then increase the original zone percentage accordingly (Hamlin, 2009).

Port-Orford-cedar Inventory (2013)



Sudden Oak Death

SOD Project Design Criteria
Within 0.5 mile of known diseased sites, no parts (boles, branches, twigs, leaves, sprouts) of tanoak (*Notholithocarpus densiflorus*), canyon live oak (*Quercus chrysolepis*) or California black oak (*Quercus kelloggii*) can be removed. *Currently, proposed salvage units are over one mile from infested sites.*

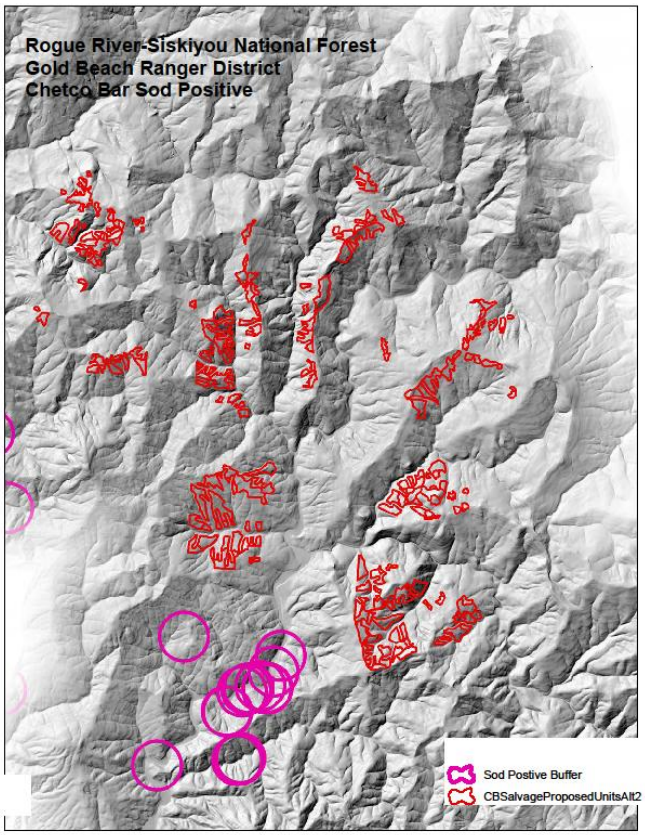
Outside of known diseased sites and within the quarantine area, tanoak, canyon live oak and California black oak may be removed if debarked or heat-treated.

Leaves, twigs, and small branches of any other known hosts cannot be removed from the quarantine area unless heat or vacuum-treated

(https://www.aphis.usda.gov/plant_health/plant_pest_info/pram/downloads/pdf_files/usdaprlist.pdf).

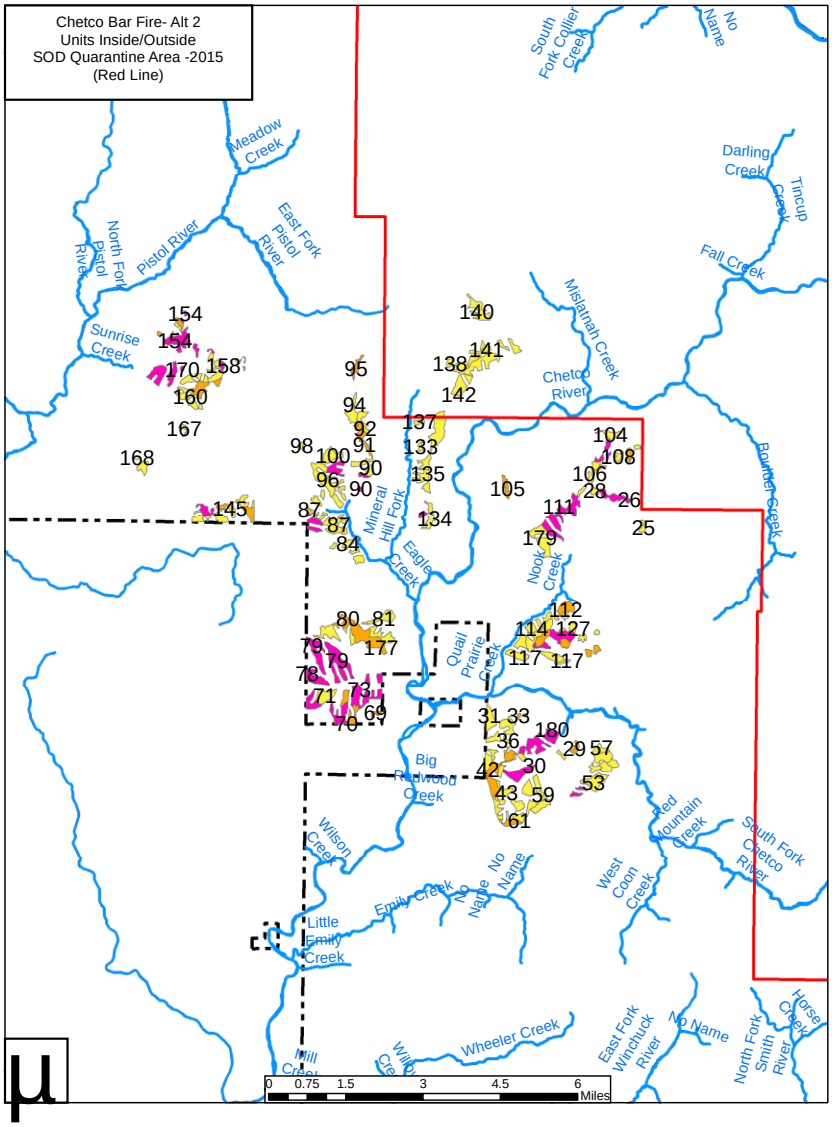
Purchasers of material from within the quarantine area, who are moving material outside of the quarantine area, must work with the Oregon Department of Agriculture to obtain necessary permits to transport host and non-host material.

2016 SOD-positive trees with ½ mile buffer.



SOD Quarantine Area

Most proposed salvage units are within the quarantine area except units 138, 139, 140, 141, 142 and the northern tip of unit 143.



Southwest Oregon Forest Insect and Disease Service Center Input

Why Plant?

The impacts of forest pathogens may be minimized if consideration of their biology, spread, and intensification are included when planning silvicultural activities in a stand.
With many pathogens, manipulating species composition on an affected site to favor those species that are resistant or immune is key to reducing disease impacts.

In some circumstances, species manipulation may be the only practical management strategy. While relying on natural regeneration to accomplish this may be possible on some sites, on many sites the species providing natural regeneration are those that maintain inoculum on a site, increase the likelihood of disease spread, and promote intensification. Natural regeneration of susceptible species, particularly without the influence of other disturbance agents (fire, windthrow, etc.), favors disease. Planting, or artificially regenerating sites allows the manager to select and favor disease-resistant or immune species. Along with other situations, it is highly recommended where the impacts of native root pathogens and dwarf mistletoe species preclude meeting resource management objectives.

Artificial regeneration of disease-resistant stock is essential to maintaining species affected by non-native pathogens. Genetic resistance to non-native pathogens is rare in native populations and the affected species will not persist without mitigation. Where *Cronartium ribicola*, (the cause of white pine blister rust) and *Phytophthora lateralis* (the cause of Port-Orford-cedar root disease) occur on high hazard sites, 95 to 100 percent of their hosts may or have be killed. To enhance and deploy disease resistance, the USFS Dorena Genetics Resource Center has been engaged for decades in identifying potentially resistant five-needle pine and Port-Orford-cedar individuals in the field, growing their progeny, testing for resistance, crossing resistant parent trees in a classical plant breeding strategy, and field testing the results. Coupled with other management actions such as pruning, in the case of white pine blister rust, and road closures, road design, vehicle washing, and others, in the case of Port-Orford-cedar root disease, planting disease-resistant stock will allow those species to continue to exist on the landscape. Biodiversity will be maintained. Resistance genes will increase in the populations over time.

Aggressive management strategies are currently in place to slow the spread of the non-native sudden oak death pathogen, *Phytophthora ramorum*; however, we anticipate that the disease will continue to cause tanoak mortality in moist tanoak forests now and in the future. Disease-resistance in tanoak is being tested, but this work is in the early stages. Artificial regeneration of non-hosts or non-bole hosts may help to slow the pathogen's spread. *P. ramorum* spreads aerially in moist conditions; Most spread is local, from tanoak to adjacent tanoak. Breaking up large continuous areas of tanoak in structure and species composition will change disease spread dynamics by slowing initial local disease spread, reducing inoculum levels overall, and reducing the probability of long-distance spread, while still maintaining tanoak on the landscape. As tanoak is a prolific sprouter and a fast-growing species, planting may be necessary for species other than tanoak to become established and dominate the canopy in the short term.

Ellen Michaels Goheen
Plant Pathologist USFS Forest Health protection
June 6, 2018

Appendix B

Siskiyou Supplement
PVT map, Aspect maps

Siskiyou Supplement –Guidelines for Harvest Prescriptions (1996, 1997, 2001)

LWD pieces per acre in Table 1a were derived from ecoplot data and represent data collected from undisturbed stands. Values shown per plant series resulted from an integration of information on soil type, aspect, climate and fire history. The objective is to leave LWM in amounts that fall within the range covered by three or one standard deviations either side of the mean. Ideally, LWM should be above the mean on some acres and below on others, but the total for the project area should hover around the mean.

Table 1a. AMOUNT OF LWM [1] PER ACRE TO REMAIN IN PROJECT AREA (revised 17Apr01 LW)

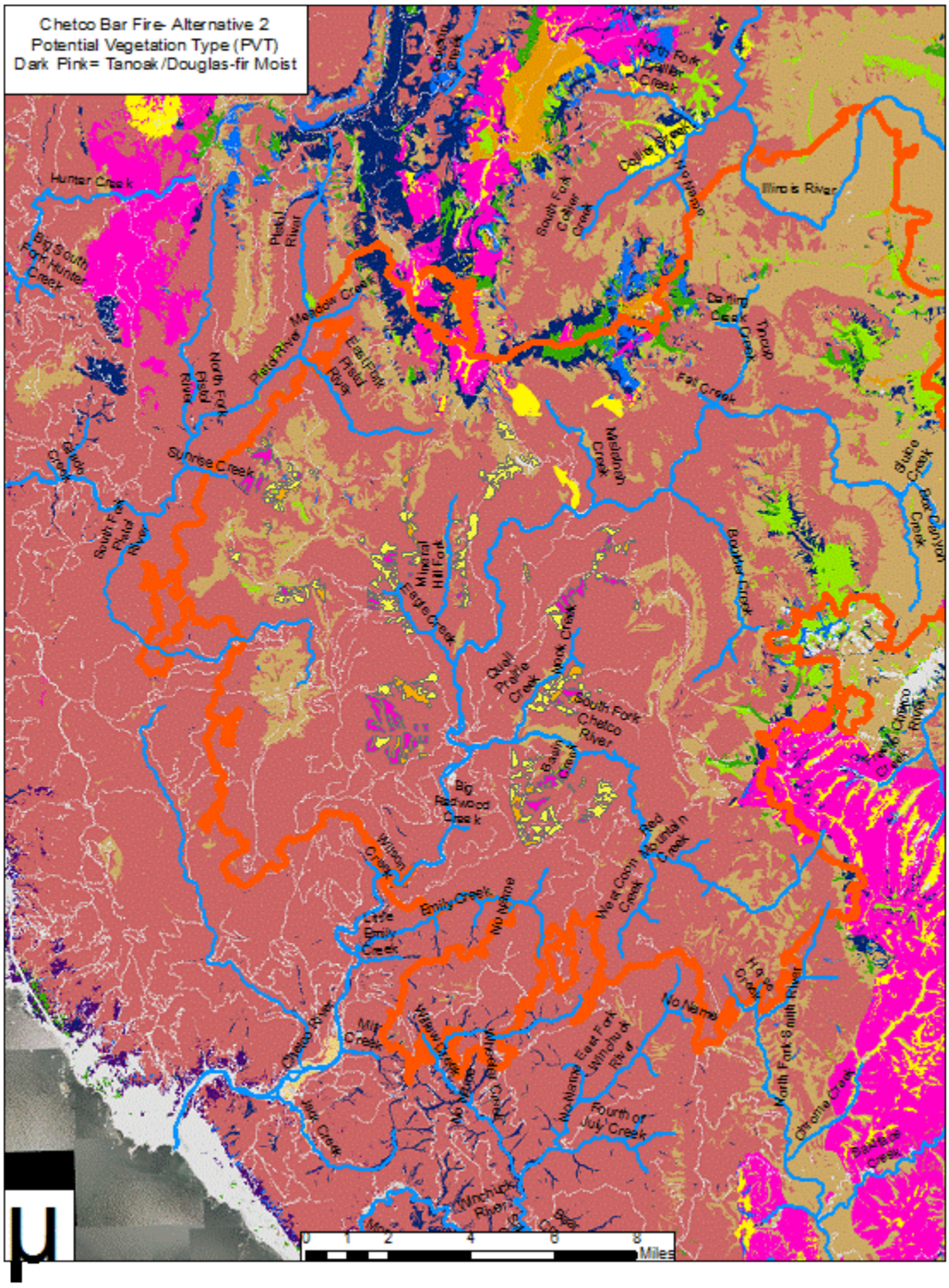
PLANT SERIES[2] ( ) = Not in Table 15 of Late Successional Reserve Assessment	PRESCRIPTION (to maintain or restore natural conditions in Matrix and other land allocations, including LSR and Riparian)	
	Final Harvest (= remove more than leave; count standing dead as LWM. Pieces are min 20" diam large end, & 20' long) (Can choose from low end of range where standing dead trees are abundant)	**Intermediate Harvest[3]** (= leave more than cut)
PIJE (sample 26) PIPO (PIMO)	1 Piece (Range = 1 to 3) **OR** (**see Table 2**) 30 Cubic Feet, (Range = 0 to 180)	Apply guidelines as for final harvest, but IDT modify to reflect the timing of stand development (ROD C-40). Maintain existing down material where possible. Intermediate harvests include thinnings, and may include group selection and other harvest alternatives which leave more trees than are cut.
LIDE3 (sample 124**)** (SESE2)	10 Pieces (Range = 0 to 39) **OR** (see **Table 2)** 1,000 Cubic Feet (Range = 0 to 3,400)	
PSME (sample 28)	5 Pieces (Range = 0 to 15) **OR** (see **Table 2)** 790 Cubic Feet (Range = 0 to 2,600)	
ABCO (sample 114)	10 Pieces (Range = 0 to 34) **OR** (see **Table 2)** 970 Cubic Feet (Range = 0 to 2,845)	
ABMAS (sample 13) (TSME)	1 Pieces (Range = 0 to 4) **OR** (see **Table 2)** 300 Cubic Feet (Range = 0 to 1,290)	
CHLA (sample 28)	21 Pieces (Range = 0 to 52) **OR** (see **Table 2)** 3,700 Cubic Feet (Range = 0 to 8,800)	
TSHE (sample 28)	35 Pieces (Range = 0 to 80) **OR** (see **Table 2)** 7,000 Cubic Feet (Range = 0 to 18,500)	

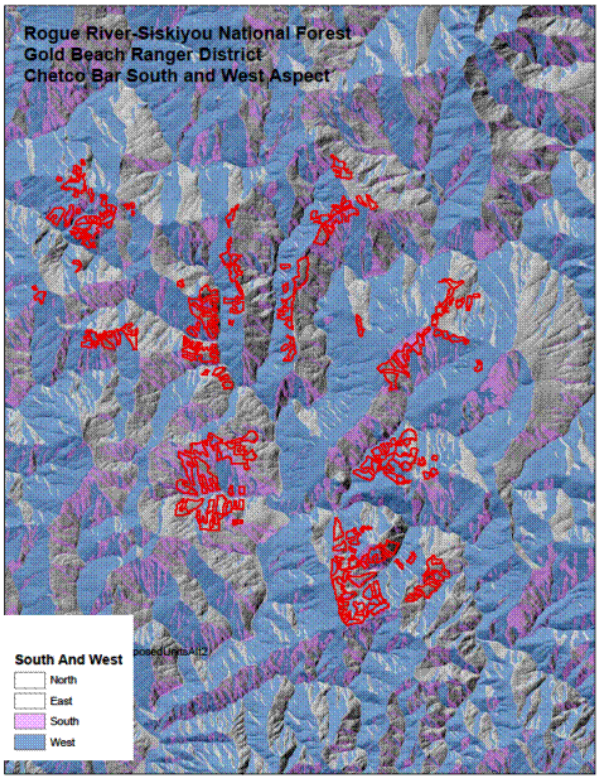
Table 1b. AMOUNT OF GREEN TREE RETENTION AND SNAGS[5] PER ACRE TO RETAIN IN HARVEST UNITS

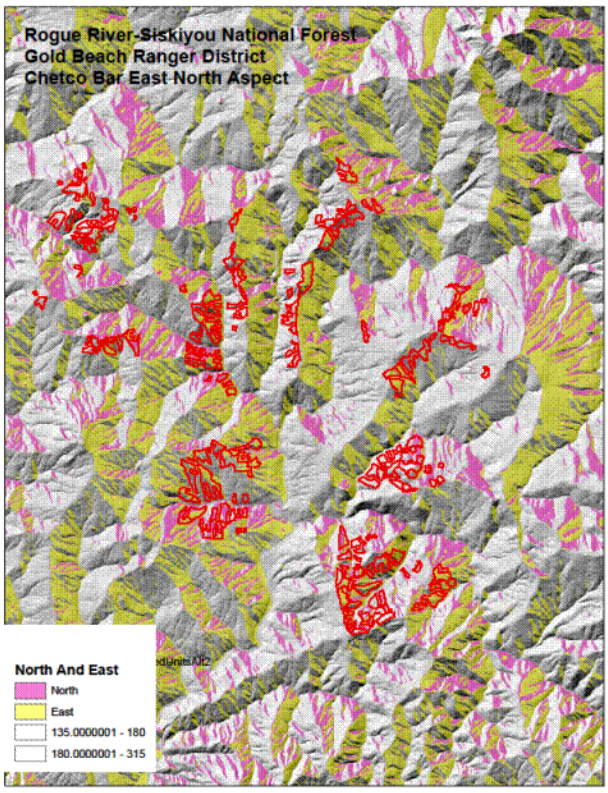
PLANT SERIES[2]	PRESCRIPTION	
	Harvest other than Thinning (for Group Select: leave blocks may meet GTR goals)	Intermediate Harvest [4] (Thinning)

GREEN TREE RETENTION All Series	10% of unit in .5 to 2.5+ ac patches, & 5% in .1 to <.5 ac patches OR single trees[5]. Calculate number of single trees to be left as a function of % of basal area (see **Table 4**).	Does Not Apply (2nd paragraph from bottom of page C-41, ROD)
SNAG RETENTION Wildlife Reserve Trees[6] for cavity-nesting birds All series	Leave 2 or 2.5 dead trees per acre: (a) 2 = "universal" group of Pileated, Flicker, Downy, Hairy, and RH Sapsucker; (b) 2.5 if either Acorn or White-headed also present. Snags should be at least 15" dbh and 10' high. Meets 60% habitat capability level. Count **existing hard** snags in Green Tree Retention patches towards the 2 or 2.5 objective. If not enough dead trees (preferably hard snags, rather than soft) are available, leave additional (green) Snag Recruitment Trees > 15"dbh (in **addition** to Green Tree Retention above). Add these green recruitment trees to GTR clump(s). *Option is available to kill or top green "snag recruitment" trees, or inoculate with fungus*.	Retain Existing snags and may create snags

Chetco Bar Fire - Potential Vegetation Typing (Henderson 2013)




Rogue River-Siskiyou National Forest
Gold Beach Ranger District
Chetco Bar South and West Aspect
South And West
North
East
South
West


Rogue River-Siskiyou National Forest
Gold Beach Ranger District
Chetco Bar East North Aspect
North And East
North
East
135.0000001 - 180
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Appendix C

New Prescriptions
Down Wood/Snags

Prescription A - DecAid

DecAid is an advisory tool based on best available science to help determine reference and current conditions for large snags and other dead wood at the watershed scale (Mellen-McLean and others 2012). It is based on data from plots in unharvested stands to provide dead wood distribution that represents natural variation for comparison with the current distribution of dead wood in a watershed. DecAid advises managing the distribution of dead wood for a landscape to reach general natural conditions that mimic dead wood distribution within unharvested stands.

Pre- and post fire DecAid histograms were analyzed for the Chetco Bar fire salvage project for wildlife habitat needs. Because the project affects a small amount of the burned landscape, the DecAid advice was considered for snag retention to meet 30 percent tolerance levels of an unharvested landscape composition (Allison 2018).

Snags - In order to maintain 30 percent tolerance levels for wildlife that use snags in these Matrix stands (outside of northern spotted owl post-fire foraging habitat in NSO core areas, DecAid advice is to leave 4 snags greater than10-inch diameter per acre, of which two are greater than 20-inch diameter. These snag density recommendations are two times higher than those described in the LRMP and exceed the Siskiyou Supplement guidelines and recommendations in the Chetco and Pistol River watershed analyses with the addition of 2 snags per acre at least 10-inch diameter. Treatment units should retain aggregates and individual snags where feasible.

Down Wood - Desired down wood retention for wildlife is to protect existing large down wood and add wood (including retained snags) to meet the Siskiyou Supplement Standards for tanoak and dry Douglas fir plant series (10 pieces of down wood 20-inch diameter at large end by 20-feet long, 5 pieces of down wood of same size in Douglas-fir series). This amount of down wood is defined as the *low* level to be retained as described in the landscape stratification section of the prescription. Smaller down wood would be added to meet 1.4 percent cover where possible. Down wood retention should be a priority near unburned edges, rock outcrops, riparian avoidance areas or remaining individual or clumps of green trees.

The Forest Plan does not require that every acre meet this amount or that all down wood cover be one size. Quantities will be site-specific depending on what sizes and quantities of material are available and consider that retained snags will also contribute to future down wood. Additionally, taller trees retained for down wood can count towards multiple 20-foot long pieces.

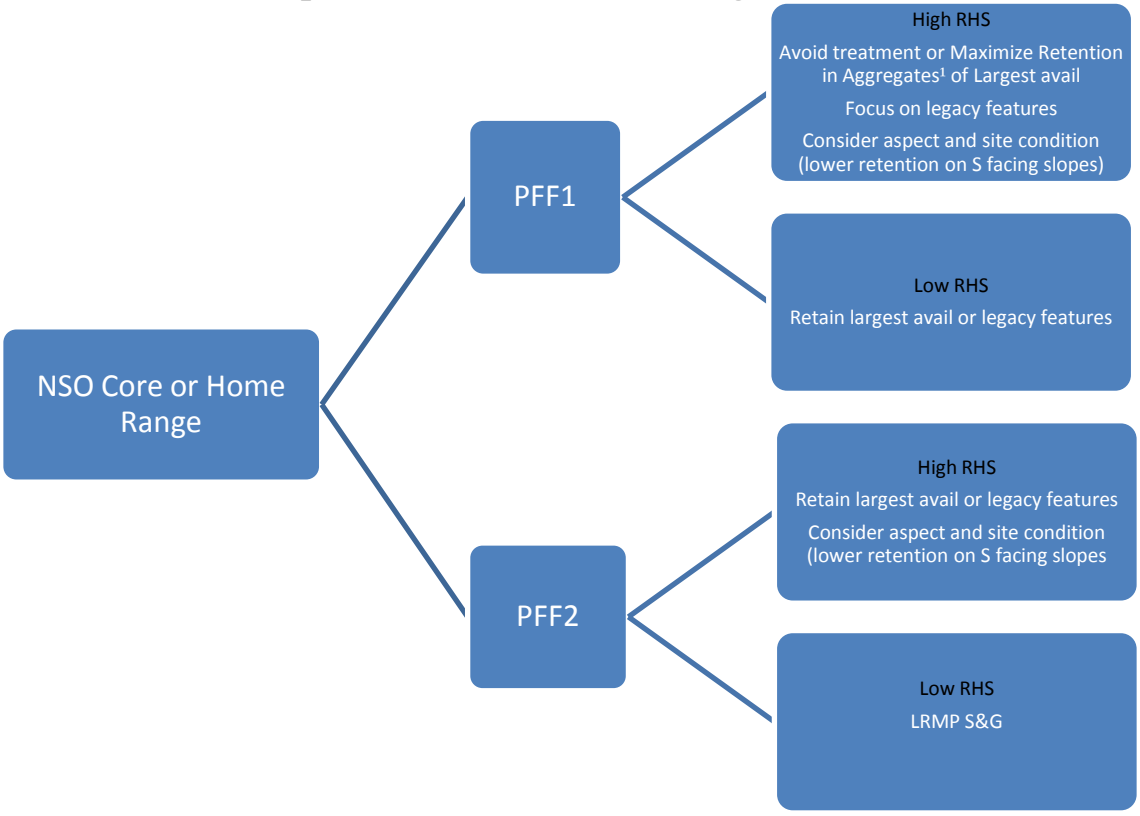
Example: One alternative to meet both the Forest plan requirement and current down wood guidance would be to leave up to ten 20-inch diameter pieces (0.72 percent cover), then add smaller diameter down wood to reach 1.4 percent cover which may include *hardwood* (e.g. forty 20-foot pieces of 6 inch diameter at large end (0.7 percent cover).

DecAid Diameter Conversion Table*

Large end diameter (inches)	Down wood length (feet)	Percent (%) cover on per acre basis
6	20	0.018
8	30	0.035
10	40	0.057
12	20	0.041
12	40	0.073
12	65	0.099
15	20	0.053
15	40	0.096
15	60	0.129
15	75	0.148
20	20	0.072
20	40	0.134
20	60	0.187
20	80	0.230
20	100	0.263
30	20	0.110
30	40	0.210
30	60	0.301
30	80	0.383
30	100	0.454
30	140	0.569

*Conversion of individual pieces of down wood to percent cover given large end diameter and length.

Prescription B – Northen Spotted Owl; Post Fire Foraging Habitat



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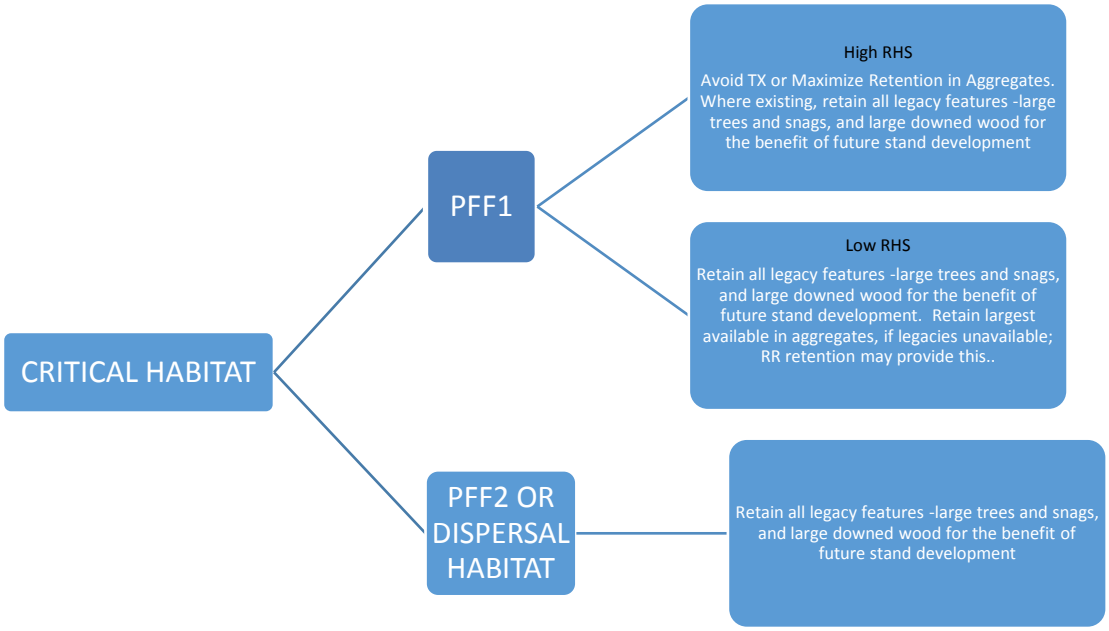

[1]Place aggregates in locations where incidental damage from implementation is minimized. Favorable locations would be in lower portions of cable units and/or centered around unique areas such as rock outcrops, riparian areas/seeps/springs. The intention is minimize the overall size of openings and an increase in the connectivity between remaining suitable habitat in areas of likely use

DEFINITIONS:

PFF1 = "POST-FIRE FORAGING" = NRF burned at high/mod severity within 500 feet of existing NRF. Diffuse edge; higher likelihood of use.

PFF2 = NRF burned at high/mod severity further than 500 feet of existing NRF. Interior patches of high severity = lower likelihood of use.

HIGH RHS = Relative habiatat suitability value over 35 (USFWS 2011, APPENDIX C). Areas within the landscape containing biotic/abiotic conditions associated with NSO occupancy.

LOW RHS = Relative habiatat suitability value under 35 (USFWS 2011, APPENDIX C). Areas within the landscape not containing biotic/abiotic conditions associated with NSO occupancy.

LEGACY FEATURES = old standing trees that have persisted on the landscape after human and/or natural disturbances. Legacy trees or snag size vary depending on site productivity, are usually disproportionately large diameter trees that are often remnants of the previous stand.

Legacies are large trees or snags containing one or more of the following characteristics:

- split or broken tops,
- burned out cavities,
- heavy decadent branching,
- large mistletoe brooms,
- otherwise damaged to the degree that a cavity may form such as
    - basal fire or lightning scars, or
    - other features that indicate decay or defect.

ASSUMPTIONS

DISPERSAL HABITAT = Generall forested habitat lacking nest/roost sites and providing limited foraging opportunities due to paucity of complex cover, structure, species composition/diversity.

- This is an unsurveyed landscape so assume NSO home ranges are occupied unless analysis concludes suitable habitat was significantly affected by high severity fire
- Precise core area locations are uncertain, so incorporate RHS model to inform likelihood of use/occupancy.
- Habitat use is influenced by biotic and abiotic factors occurring at different spatial scales

Appendix D

Managed Stands - Past Harvest Management

ALTERNATIVE 3 MANAGED STAND PAST MANAGEMENT - HARVEST

Unit #	sale name	year	Rx	Unit #	sale name	year	Rx	Unit #	sale name	year	Rx
25	Grouse U-1	1966	HPR	**72**	Eagle Creek Burn #1	1953	HCC	**117**	Quail Prairie Creek U-1	1960	HCC
26	Long Ridge BP	1976	SDR		UC7			**118**	Quails Foot U-4	1979	HCC
28	Long Ridge BP U-3 EP #18	1976	SDR	**73**	Eagle Creek Burn #1	1953	HCC	**120**	Devils Back U-4	1977	HCC
29	Kettle unit 7	1992	HCC					**121**	Quails Foot U-7	1979	HCC
31	Broken Basin U-4	1976	HCC	**74**	Eagle Creek Burn #1	1953	HCC	**123**	Devils Wind U-1	1983	HCC
34	North Basin Butte U-1	1968	HCC		Panther Creeek U2	1981	HCC	**127**	Quails Foot U-3	1979	HCC
36	Basin Butte BP U-2	1965	HCC		UC7	2011	HTH	**128**	Red Mt U-2	1966	HCC
37	Basin Oak-Fir U-1	1971	HCC	**79**	Eagle Creek Burn #2	1954	HCC	**129**	Red Mt U-2	1966	HCC
38	Basin Oak-Fir U-1	1971	HCC		Prairie Creek Snag Salv1	1957	HPR	**130**	Devils Wind U-2	1983	HCC
39	Basin Oak-Fir U-1	1971	HCC		Prairie Creek BP U-2	1979	SDR	**131**	Devils Back U-3	1977	HCC
40	Oak Basin U-1	1966	HCC	**81**	Rainbow Creek U-2	1961	HCC	**133**	Brown Bear U-1	1978	HCC
41	Kettle unit 3	1992	HCC		Rainbow Blowdown U-1	1964	HCC	**134**	Bruin Snag Residue U-1	1970	HSV
44	Kettle unit 7	1992	HCC	**83**	No Name BP U-2	1978	SDR		Ursus Minor U-1	1972	HSV
45	Basin Creek U-2	1967	HCC	**84**	Rainbow Creek U-4	1962	HCC		Upper Chetco SO #11022	1981	SDR
	Backbone unit 20	2013	HTH		No Name U-1	1974	HCC	**135**	Big Bear Springs U-2	1967	HCC
47	Basin Creek U-1	1967	HCC		No Name U-3	1974	HCC	**139**	Mineral Hill U-5	1964	HCC
	Backbone unit 18	2013	HTH		Finale U-4	1990	HCC	**140**	Mineral Hill U-7	1964	HCC
48	West Swede Fir Oak U-1	1973	HCC	**87**	Rainbow Creek U-4	1962	HCC		Mineral Fire	1979	DFR
50	Snake Basin U-2	1979	HCC		Upper Eagle Creek U-1	1967	HCC		Mismineral U-2	1987	HCC
54	West Swede Fir Oak U-6	1973	HCC		No Name U-4	1975	HCC	**141**	West Mislatnah U-2	1973	HCC
56	West Swede Fir Oak U-5	1973	HCC	**88**	Rainbow Creek U-4	1962	HCC		West Mislatnah U-3	1973	HCC
57	West Swede Fir Oak U-2	1973	HCC		Upper Eagle Creek U-1	1967	HCC	**144**	Buzzard Roost U-1	1968	HCC
59	North Coon U-4	1978	HCC	**89**	Feather U-1	1971	HCC	**145**	Buzzard Roost U-1	1968	HCC
60	Snaketooth U-1	1964	HCC	**96**	Feather unit 3	1972	HCC		UC 9	2011	HTH
61	Snake Basin U-1	1980	HCC		Finale U-6	1990	HCC	**146**	Hazel Camp TSI	1971	SPC
62	Snaketooth U-1	1964	HCC	**92**	Mineral Slackline U-3	1974	HCC	**147**	Crippled Eagle U-1	1979	HCC
	Water Snake U-1	1981	HCC	**94**	Slackline BP U-1	1976	SDR	**148**	Buzzard Roost TSI U-2	1962	SRL
	Sixteen U-2	1979	HCC	**97**	Feather BP U-4	1979	SDR		UC 10	2011	HTH
	Snaketooth BF U-1	1972	RPL	**98**	Three Tree #2 NSR TSI BF	1960	SRL	**152**	Sunrise Pistol U-2	1978	HCC
	Upper Basin Creek unit 1	1970	HCC	**99**	Feather U-2	1971	HCC	**160**	Stackyards 3/4	1969	HCC
63	Upper Basin Creek unit 1	1970	HCC	**102**	Tolman	1972	HCC		Sunrise U-3	1973	HCC
64	Broken Basin U-3	1976	HCC	**103**	Loban TBV	1989	HCC	**162**	Sunrise U-1	1969	HCC
66	Broken Basin U-2	1976	HCC	**108**	Tolman U-3	1971	HCC	**166**	Stackyards 2	1969	HCC
	Broken Basin EP #13	1976	HCC	**112**	Quails Foot U-1	1979	HCC	**173**	Upper Eagle Creek U-1	1967	HCC
67	Basin Butte U-1	1965	HCC		Quails Foot U-2	1979	HCC	**175**	Prairie Creek Snag Salv1	1957	HPR
	Sixteen U-3	1979	HCC	**113**	Quail Prairie Creek U-2	1960	HCC	**176**	Rainbow Creek U-2	1961	HCC
68	Upper Basin Creek unit 1	1970	HCC		Quails Foot U-1	1979	HCC	**177**	Prairie Creek Snag Salv1	1957	HPR
69	Panther 40 U1	1974	HCC		UC 6	2012	HTH		Rainbow Creek U-2	1961	HCC
70	Eagle Creek Burn #1	1953	HCC	**114**	Quail Prairie Creek U-2	1960	HCC				
	UC7	2011	HTH		UC 6	2012	HTH				

Appendix E

Marking Guides

Chetco Bar Fire Salvage Draft Marking Guides – June 22, 2018

MARKING GUIDE SUMMARY

Standing dead or dying trees 7 inches diameter at breast height (DBH) and greater would be available for harvest. Fire-injured (dying) trees with green crowns will be marked using the *Marking guidelines for fire-injured trees in California* (Smith & Cluck. 2011) as follows:

Table 3. Smith and Cluck guidelines for 60% predicted mortality rate by species* and diameter

Species	**Diameter**	**Remove trees with % length of crown scorch greater than or equal to:**
Incense Cedar	10-60"	85%
Species	**Diameter**	**Remove trees with volume % of crown scorch greater than or equal to:**
Douglas Fir	10"-40"	70%

*Retain other tree species for snags and future down wood.

Redwoods - All redwoods shall be retained. Any redwood that needs to be cut for safety reasons shall be left on site and not removed.

Riparian Reserves – Boundaries will be delineated using the following table*:

Riparian Reserve Boundaries by Stream Class

Stream Class	**Description**	**Riparian Reserve Width (slope distance (ft) from edge of channel)**
1&2	Perennial, fish-bearing streams	350 feet
3	Perennial, non-fish bearing streams	175 feet
N/A	Constructed ponds, lakes reservoirs, and wetlands > 1 acre	175 feet
N/A	Lakes and natural ponds	350 feet
4	Ephemeral or intermittent streams	175 feet
5	Wetlands < 1 acre, and unstable or potentially unstable areas	25 feet

*A Hydrologist, Soil Scientist, or Fisheries Biologist can assist with field validating site-specific riparian reserve boundaries.

Northern Spotted Owl

*Existing snags and down wood***-** Leave aggregates and individuals of large legacy snags (**see marking guide for affected units**). Avoid and protect existing large down wood ≥10 inches dbh to the greatest extent possible. Use treatment skips to avoid large dead wood (>20 inches dbh) or areas of accumulated dead wood.

Retention of hardwoods – retain large hardwood snags (>10" diameter) to the extent possible. Any hardwoods felled would be left onsite. **All units**.

The goal of snag and down wood retention is to leave *variable* quantities across the landscape based on site productivity, landform position, resource objectives, proximity to untreated burned areas and logging system logistics.

The intention is to minimize the overall size of openings and increase connectivity between remaining suitable habitats in areas of likely use and to integrate snag/down wood retention with visual management objectives where feasible**.**

Worker safety is the *highest priority* when locating snag/down wood retention areas.

Marbled Murrelet
Protect live legacies **-** Maintain a 70-foot (1/2 site potential tree) un-treated buffer around any live legacy trees with potential structure including trees directly adjacent to the unit boundary. No live legacy trees would be removed for any reason including roads, landings or yarding corridors.

Units 25, 29, 49, 53, 55, 58, 69, 99, 100, 103, 106, 107, 127, 132, 140, 141, 147, 148, 155, 157, 159, 160, 167, 168, 169, 170.

Port-Orford-cedar
Dry Season Restrictions - Generally June 1 – September 30 for logging operations. Logging operations may continue in dry conditions outside of this period, and in wet conditions if washing and project scheduling are utilized (see POC inventory map, Appendix A).

Utilizing Uninfested Water - Use uninfested water sources for planned activities such as equipment washing, road watering, and other water-distribution needs, or treat water with Ultra Clorox®, at a rate of 1 gallon of bleach/1000 gallons of water. Note: ***East Fork Pistol Rive***r is an infested stream.

Units 92, 93, 133, 134, 135, 136, 137, 138, 139, 140, 141, 143

Washing Project Equipment -Wash project equipment daily before entering un-infested 7th field watersheds (see POC inventory map, Appendix A). Wash trucks and project equipment with bleach solution at strategic locations outside of these 7th field watersheds during wet season operations.
Note: ***East Fork Pistol Rive***r is an infested stream.

Units 92, 93, 133, 134, 135, 136, 137, 139, 140, 143.

Sudden Oak Death
Within 0.5 mile of known diseased sites, no parts (boles, branches, twigs, leaves, sprouts) of tanoak (*Notholithocarpus densiflorus*), canyon live oak (*Quercus chrysolepis*) or California black oak (*Quercus kelloggii)* can be removed.

Currently proposed treatment units are > 1 mile away from identified 2016 SOD positive tree sites. (see SOD positive tree map, appendix A).

Outside of known diseased sites and within the quarantine area, tanoak, canyon live oak and California black oak shall not be removed unless debarked or heat-treated.

Leaves, twigs, and small branches of any other known hosts cannot be removed from the quarantine area unless heat or vacuum-treated
(https://www.aphis.usda.gov/plant_health/plant_pest_info/pram/downloads/pdf_files/usdaprlist.pdf).

Purchasers of material from within the quarantine area, who are moving material outside of the quarantine area, must work with the Oregon Department of Agriculture to obtain necessary permits to transport host and non-host material.

All units are in the quarantine area except units 138- 142 and the northern tip of unit 143 (see SOD quarantine area map, appendix A).

Visuals
The objective is to minimize intensity and duration of visual effects of project activities across the project footprint. **All units**

Particular care should be taken in units with partial retention visual quality objective (VQO) seen in the middleground and background from scenic viewpoints, primary roads (1376, 1917, 1909), trails, trailheads, and recreation sites:

Units 1, 4, 9, 11, 12, 13, 15, 16, 17,18, 19, 20, 22, 23, 25, 26,27, 31, 32, 33, 35, 38, 40, 64, 65, 66, 76, 102, 103, 104, 106, 107, 108, 110, 111, 114, 125, 130, 131, 140, 141, 142, 143, 176, 177.

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Outside of NSO core, home range or critical habitat	EA Unit#.	Retained Snag TPA	Layout Considerations
Snags	All units except units in NSO habitat listed below	4 snags > 10 inches of which 2 snags > 20 inches	Snags should include hardwoods where available. Snag retention should be a priority near unburned edges, rock outcrops, riparian avoidance areas or remaining individual or clumps of green trees.
Down Wood	Same	Tanoak series 10 pieces* per acre Douglas-fir series 5 pieces per acre (149, 159, 167, 180)	Protect existing large down wood and add wood pieces (including retained snags) to meet Siskiyou Supplement, add smaller down wood (including hardwoods) to meet 1.4% cover (DecAid) where possible (see diameter conversion table). Down wood retention should be a priority near unburned edges, rock outcrops, riparian avoidance areas or remaining individual or clumps of green trees. *piece = 20 inches at large end and 20 feet long
NSO PFF Habitat			
PFF1/High RHS habitat	None	N/A	
NSO core area	137	4 snags > 10 inches of which 2 snags > 20 inches Down wood 10 pieces per acre	Capable habitat
NSO home ranges with PFF1/Low RHS habitat:	35, 90, 107, 157, 163, 165, 180, 170, 104, 160, 156	Retain Legacy* Features **or** Largest Available to achieve 4 snags > 10 inches of which 2 snags > 20 inches	
NSO home ranges with PFF2/High RHS habitat:	53, 55, 56, 104, 116, 117, 118, 119, 121, 122, 123, 180	Retain Legacy* Features **or** Largest Available to achieve 4 snags > 10 inches of which 2 snags > 20 inches	Consider aspect and site conditions, lower retention on S-facing slopes.

NSO critical habitat with PFF1/Low RHS	90	Retain all Legacy* features- large trees and snags, large down wood	Retain largest available in aggregates; if legacies unavailable riparian reserves may provide these.
NSO critical habitat with PFF2/High RHS	104	Retain all Legacy* features- large trees and snags, large down wood	
NSO critical habitat Dispersal	None	N/A	
MAMU			
Protect live legacies -	Units 25, 29, 49, 53, 55, 58, 69, 99, 100, 103, 106, 107, 127, 132, 140, 141, 147, 148, 155, 157, 159, 160, 167, 168, 169, 170.	Maintain a 70-foot (1/2 site potential tree) un-treated buffer around any live legacy trees with potential structure	Include live legacy trees with potential structure directly adjacent to the unit boundary. -
VISUALS	**EA Unit#.**	**Retention**	**Layout Considerations**
	Units 1, 4, 31, 32, 35, 38, 40, 110, 111, 125, 140, 176, 177, 33, 64, 65, 66, 9, 11, 12, 13, 15, 16, 18, 19, 20, 22, 23, 25, 27, 76, 102, 103, 104, 106, 107, 108, 114, 130, 131, 141, 142, 143, 17, 26.	Retain hardwoods <= 7 inches where feasible Skip overstory hardwood thickets within units to mimic landscape vegetative patterns. Retain green conifer trees, and understory non-dead and dying vegetation where feasible Retain snags and Legacy* features in clumped aggregates with scattered single trees where feasible.	Mimic the size and shape of natural openings. Avoid straight lines and angular corners; follow contours and natural terrain features where feasible. Feather the edges of created openings with non-merchantable trees, small woody understory vegetation and snag/LWM. Place tree markings in positions least visible to the public. See Visual PDCs for stump heights, slash treatments, etc.

*** LEGACY FEATURES =** old standing trees that have persisted on the landscape after human and/or natural disturbances. Legacy trees or snag size vary depending on site productivity, are usually disproportionately large diameter trees that are often remnants of the previous stand.
Legacies are large trees or snags containing one or more of the following characteristics:

- split or broken tops, -large mistletoe brooms
- burned out cavities, -otherwise damaged to the degree that a cavity may form: basal
- heavy decadent branching, fire, lightning scars, features that indicate decay or defect.

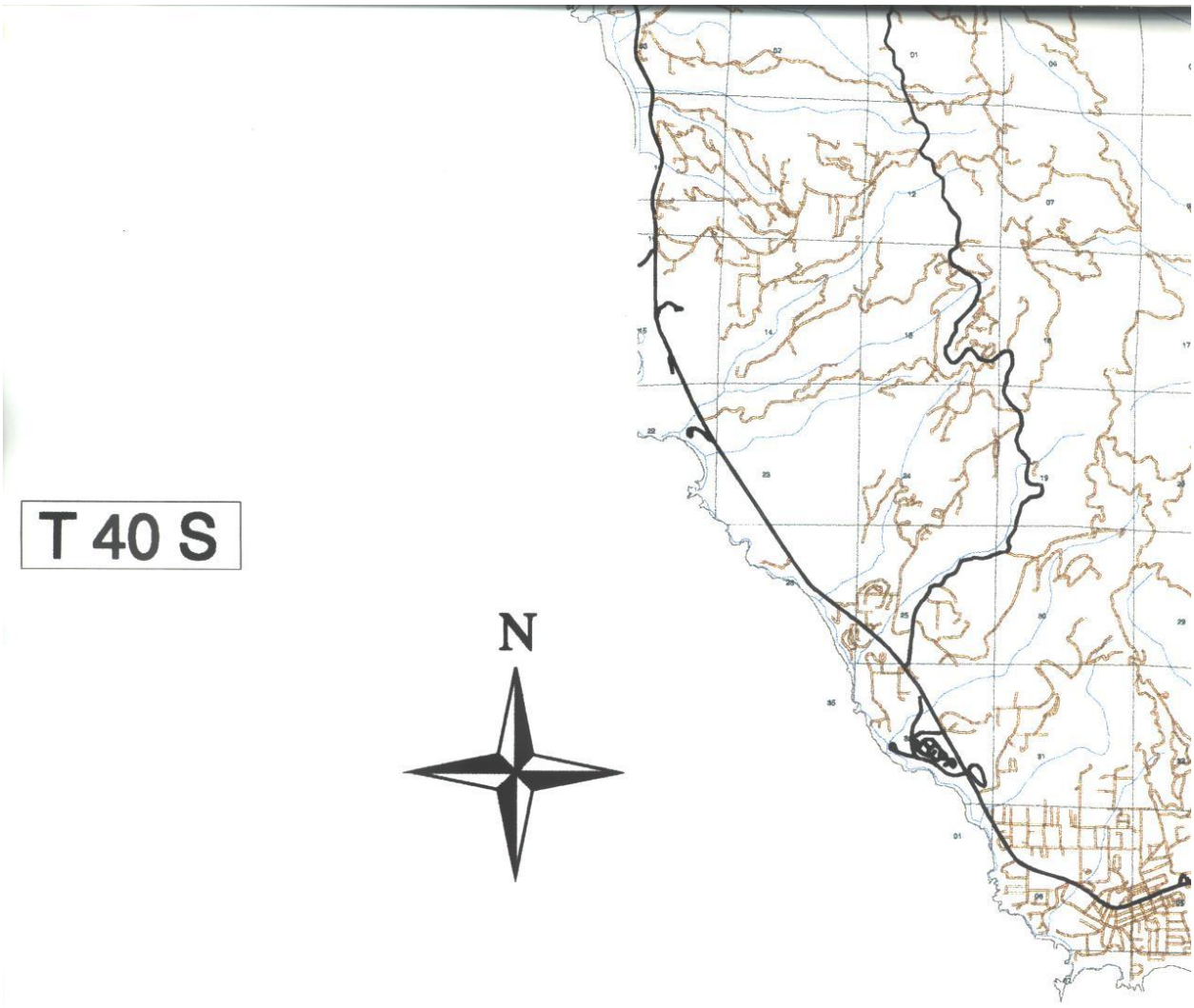
DecAid Diameter Conversion Table**

Large end diameter (inches)	Down wood length (feet)	Percent (%) cover on per acre basis
6	20	0.018
8	30	0.035
10	40	0.057
12	20	0.041
12	40	0.073
12	65	0.099
15	20	0.053
15	40	0.096
15	60	0.129
15	75	0.148
20	20	0.072
20	40	0.134
20	60	0.187
20	80	0.230
20	100	0.263
30	20	0.110
30	40	0.210
30	60	0.301
30	80	0.383
30	100	0.454
30	140	0.569

**Conversion of individual pieces of down wood to percent cover given large end diameter and length.

Appendix F

Redwoods



Stands containing mature redwood

Stands containing younger redwood

Units planted with redwood

Private land within forest